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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/617,476	07/11/2003	Cha Deok Dong	29936/39474	3456
4743	7590	09/22/2004	EXAMINER	
MARSHALL, GERSTEIN & BORUN LLP 6300 SEARS TOWER 233 S. WACKER DRIVE CHICAGO, IL 60606			CHAUDHARI, CHANDRA P	
			ART UNIT	PAPER NUMBER
			2813	

DATE MAILED: 09/22/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/617,476	<b>Applicant(s)</b> DONG ET AL.	
	<b>Examiner</b> Chandra Chaudhari	<b>Art Unit</b> 2813	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 10 July 2003.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-11 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 1, line 6, the phrase “along the step of the results” is unclear in meaning;

line 9, “tope” should be “top”.

In claim 3, line 6, “along the step” is unclear in meaning.

In claim 4, the dependency is incorrect – should depend on “claim 3”.

In claim 7, line 11, the phrase “along the step” is unclear in meaning.

In claim 10, line 4, “the first oxide film” lacks antecedent basis;

line 6, “the nitride film” lacks antecedent basis.

line 8, “the second oxide film” lacks antecedent basis.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ogle – US 6,512,264.

Ogle (Figs. 2-4 and text in col. 3, line 55 to col. 4, line 18 and col. 5, lines 15 to 59) discloses substantially the claimed invention by forming a floating gate 30, nitrifying the top of the floating gate, and forming a dielectric film with an ONO structure. Although Ogle does not disclose that the step of nitrifying and forming the dielectric film are implemented in-situ within the same chamber, he does teach at col. 5, lines 15-25, that the ONO stack is then formed over the pre-interpoly layer, and as there are common gases for the polysilicon treatment phase and the ONO forming phase, one of ordinary skill in the art would be motivated to use the same chamber.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the same chamber for nitrifying and forming the dielectric film, as this would reduce device contamination.

Claims 3-4, 6-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ogle as applied to claims 1-2 above, and further in view of Kaneoka – US 6,344,394.

Ogle is applied as above from claims 1-2 and does not disclose using  $N_2O$  and DCS ( $SiH_2Cl_2$ ) to form the oxide films and DCS and  $NH_3$  to form the nitride film. He also does not disclose changing the temperature to a second temperature to form the dielectric film. Kaneoka (Figs. 6c-6g and text in col. 1, line 66 to col. 2, line 35) teaches to use  $N_2O$  and DCS to form the oxide films and DCS and  $NH_3$  to form the nitride film at the claimed temperatures. As Ogle uses a first temperature to treat the polysilicon film, and the dielectric film is formed at a second temperature according to Kaneoka, claim 7 would have been obvious to one of ordinary skill in the art. Kaneoka also teaches to steam anneal the dielectric film to form a dense silicon oxide film.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the gases as above as being conventional. Steam annealing may be used to alter the breakdown voltage of the dielectric film. Using specific temperatures and changing to a second temperature to form the dielectric film as well as the flow rate, pressure and gas ratio may be optimized for obtaining a film with the desired breakdown voltage.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Lin - US 6,127,227 , Lin - US 6,362,045 , and Dong - US 2003/0153149 describe nitriding and ONO layers.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chandra Chaudhari whose telephone number is 571-272-1688. The examiner can normally be reached on Mon - Fri (9:00-5:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead Jr. can be reached on 571-272-1702. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Chandra Chaudhari

Primary Examiner

Art Unit 2813



Chandra Chaudhari

September 17, 2004